



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/719,441	11/20/2003	Yumin Liu	SYMYX/8DIVCO	2966

1473 7590 11/29/2005

FISH & NEAVE IP GROUP  
ROPES & GRAY LLP  
1251 AVENUE OF THE AMERICAS FL C3  
NEW YORK, NY 10020-1105

EXAMINER

NGUYEN, TAM M

ART UNIT	PAPER NUMBER
----------	--------------

1764

DATE MAILED: 11/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/719,441

Applicant(s)

LIU, YUMIN

Examiner

Tam M. Nguyen

Art Unit

1764

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 August 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 109-116 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 109-116 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION*****Response to Amendment***

The rejection of claims 112-116 under 35 USC § 103 over McCain (4,524,236) in view of Ellis (6,548,697) is withdrawn by the examiner in view of the response filed on August 23, 2005.

***Double Patenting***

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 109-116 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 72-83 of U.S. Patent No. 6,417,422.

Although the conflicting claims are not identical, they are not patentably distinct from each other because both sets of claims claim a process of preparing alkene from an alkane feedstock by using a Ni catalyst. The Patented claimed set does not specifically disclose that the reaction zone is maintained at a temperature ranging from about 200 to 350° C. However, the patented claimed set claims that the reaction temperature ranges from about 200 to 500° C. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of the claimed set by operating the process at a temperature of from 200 to

Art Unit: 1764

350° C because one skill in the art would operate the process at any temperature of from 200 to 500° C including the overlapped temperatures.

Claims 109-111 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 9 and 41 of U.S. Patent No. 6,355,854.

Although the conflicting claims are not identical, they are not patentably distinct from each other because both sets of claims claim a process of preparing alkene from an alkane feedstock by using a Ni catalyst. The Patented claimed set does not specifically disclose that the reaction zone produces alkene in a molar concentration of at least about 5% relative to total moles of hydrocarbon. However, the process of the Patented claimed is essentially the same as the present claimed process in terms of feedstock and catalyst. It would be expected that the dehydrogenation product would have a molar concentration of alkene as claimed.

Claims 109-111 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 24 and 56 of copending Application No.09/815,914. Although the conflicting claims are not identical, they are not patentably distinct from each other because both sets of claims claim a process of preparing alkene from an alkane feedstock by using a Ni catalyst. The co-pending claimed set does not specifically disclose that the reaction zone produces alkene in a molar concentration of at least about 5% relative to total moles of hydrocarbon. However, the process of the Patented claimed is essentially the same as the present claimed process in terms of feedstock and catalyst. It would be expected that the dehydrogenation product would have a molar concentration of alkene as claimed.

Art Unit: 1764

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claim 109 is rejected under 35 U.S.C. 103(a) as being unpatentable over McCain (4,524,236)

McCain discloses an oxydehydrogenation process to convert alkanes (e.g., ethane) to alkenes (e.g., ethylene) by contacting the alkanes, in the presence of oxidizing agent, with a catalyst comprising nickel. The reaction has a selectivity of greater than 50%. Since the reaction has a conversion of greater than 60%, the product would have a concentration of alkenes greater than 5 % relative to total moles of hydrocarbon. (See abstract; col. Tables 1 and 2)

McCain does not disclose that the feedstock comprises at least 5 % of alkene.

Art Unit: 1764

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of McCain by using a feedstock comprising at least about 5 % of alkene as claimed because McCain teaches that the feedstock comprises less than 5 vol. % of alkene. Therefore, one of skill in the art would use a feedstock comprising about 5 molar % of alkene because it would be expected that small change in the amount of alkene in the feedstock would not affect the outcome of the process.

Claims 109-111 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCain (4,524,236) in view of Ramachandran et al. (5,043,461)

McCain does not disclose that the feedstock comprises at least 5 molar % of alkene and does not disclose a step of adding or recycling alkene to the reaction zone.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of McCain by co-feeding a C<sub>2</sub>-C<sub>4</sub> alkene to the reaction zone as taught by Ramachandran (See Fig. 4-7; col. 4, lines 6-7) because Ramachandran discloses that the step of recycling alkene to the reaction zone would increase the overall process efficiency. Consequently, the process of McCain would have the feedstock comprising at least 5% of alkene.

Claims 112-116 are rejected under 35 U.S.C. 103(a) as being unpatentable over McCain (4,524,236) in view of either Ramachandran et al. (5,043,461) or Durante et al. (5,439,859).

McCain does not disclose a second reaction zone, does not disclose a step of controlling the concentration of oxygen in the first and second reaction zone.

Durante and Ramachandran disclose a process for producing alkene by utilizing multiple reaction zones. (See Durante col. 5, lines 33-35; Ramachandran figs. 5-7)

Art Unit: 1764

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of McCain by utilizing a second reaction zone as taught by either Ramachandran or Durante because using an additional reaction zone would improve the over all conversions of the process.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the modified process of McCain by controlling the concentration of oxygen in the first and second reaction zones as claimed because the process of McCain is operated at high conversions and high selectivity as claimed. Therefore, it is within the level of one having ordinary skill in the art to control the concentration of oxygen so that the process is maintained at high conversions and high selectivity.

### ***Response to Arguments***

The double patenting rejection over claims 9 and 41 of U.S. Patent No. 6,355,845 has been changed to the double patenting rejection over claims 9 and 41 of U.S. Patent No. 6,355,854 because of previous typos.

The argument that McCain does not disclose that alkene is present in the reaction zone in a molar concentration of at least 5% during oxydehydrogenation is not persuasive. McCain teaches that the feedstock comprises less than 5 vol. % of alkene, so one of skill in the art would use a feedstock comprises about less than 5 vol. % (e.g., 4.9 vol. %). Also, during the oxydehydrogenation, at least some of alkanes are converted into alkenes. Therefore, alkenes would be present in the reaction zone in a molar concentration of at least 5%.

Art Unit: 1764

The argument that there is no motivation to modify McCain to produce a method in which the reaction zone comprises 5 molar percent of alkene during oxydehydrogenation and no reasonable expectation of success in the oxydehydrogenation methods in which the reaction zones comprises alkene during oxydehydrogenation is not persuasive. Even if no reaction occurs in the reaction zone (which is not true), one of skill in the art would use a feedstock comprising about 5 molar % of alkene because the prior art discloses a range reasonably similar or close to the claimed range, prima facie obviousness is established due to the expectation of similar results of similar ranges. See *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 783, 227 USPQ 773, 779 (Fed. Cir. 1985).

The argument that Ramachandran does not disclose specific dehydrogenation catalyst and does not disclose that the reaction zone comprises an alkene during oxydehydrogenation is not persuasive. The examiner relied upon Ramachandran to teach that the recycling step of alkene to the oxydehydrogenation reaction zone would increase the overall process efficiency. Consequently, alkene is present in the reaction zone during the reaction.

The argument that Ramachandran does not teach of co-feeding a gaseous oxidant and an alkane to a first reaction zone and does not teach dehydrogenation of alkane in the second reaction zone is not persuasive. The examiner relied upon Ramachandran to teach that adding additional reaction zone(s) in sequent to increase conversion is obvious. Ramachandran teaches a conversion process comprising dehydrogenation and oxidation reaction zones in the presence of alkane and an oxidizing agent and as claimed. It is reminded that the performance of two steps simultaneously, which have previously been performed in sequence was held to have been obvious. *In re Tatincloux* 108 USPQ 125 (CCPA 1955)



Art Unit: 1764

The argument that Durante does not mention of co-feeding a gaseous oxidant and an alkane to a first reaction zone and does not disclose the dehydrogenation of alkane in the second reaction zone is not persuasive. Since the dehydrogenation of alkane is not 100% converted, unreacted alkanes would contact with oxygen in the oxidation zone. It is reminded that the performance of two steps simultaneously, which have previously been performed in sequence was held to have been obvious. *In re Tatinclox* 108 USPQ 125 (CCPA 1955)

### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tam M. Nguyen whose telephone number is (571) 272-1452. The examiner can normally be reached on Monday through Thursday.

Art Unit: 1764

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tam M. Nguyen  
Examiner  
Art Unit 1764



10/2/05

TN